MARINE NEMATODES FROM DURBAN, SOUTH AFRICA

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SYNOPSIS

Ten new species and three new genera of free-living marine nematodes are described from the Durban area of the Republic of South Africa, thus : *Platycoma sudafricana* sp. nov. is characterized by an arrow-head-shaped flap over the amphid and, possibly, by some features of the male tail ; *Trileptium longisetosum* sp. nov. is similar to *T. ayum* Inglis, 1964 but differs in the distribution of the cervical setae and the form of the spicules ; *Mesacanthion frica* sp. nov. is characterized by the form of the spicules which have long ventro-posteriorly directed processes on their anterior ends ; *Epacanthion oliffi* sp. nov. is a short spiculed form characterized by lacking a gubernaculum and pre-cloacal supplement and having many cervical setae in the male ; *Rhabdodemania dura* sp. nov. is characterized by a lack of ventro-lateral onchia and the shape of the spicules ; *PHERONOUS ogdeni* gen. et sp. nov. of the Ironidae is characterized by a lack of caudal glands and papilla-like cephalic sense organs ; *Metoncholaimus murphyi* sp. nov. is characterized by having one pore to the demanian system, extremely long spicules and a few long circum-cloacal setae ; *WIESONCHOLAIMUS mawsonae* gen. et sp. nov. of the Oncholaimidae is characterized by long, equal, ventro-lateral onchia and a short dorsal onchium, a long stout tail, very long slim spicules and a large gubernaculum, and the presence of a demanian system ; *PLECTOLAIMUS juliani* gen. et sp. nov. of the Leptolaimidae is characterized by six distinct lips, ventral onchia-like structures at the anterior end of the oesophagus and a distinct bulb-like region with tiny valves at the posterior end of the oesophagus ; *Bathylaimus deconincki* sp. nov. is characterized by a large relatively posterior amphid and by the shape of the spicules and gubernaculum. *Hyalacanthion* Wieser, 1959 is a synonym of *Epacanthion* Wieser, 1953 because *E. butschlii* (Southern, 1914), type species of *Epacanthion*, has typical *Hyalacanthion* mandibles. As a further consequence it is argued that subdivision of the families of the Enoploidea is not yet possible, in spite of De Coninck's recent attempt, particularly as De Coninck refers *Hyalacanthion* to one subfamily and *Epacanthion* to another.

INTRODUCTION

THREE samples of free-living marine nematodes were sent to me by Dr. W. D. Oliff, South African Council for Scientific and Industrial Research, National Institute for Water Research. These samples contain ten species, all of which are described below as new, referable to ten genera, of which three are new. As usual only those species represented by males in good condition are described. The species were collected from the following localities :

Beach sand in the surf zone from the Durban area on 10.viii.1964. (Collection number : B8n8.)

1 ♂. *Bathylaimus deconincki* sp. nov.
2 ♂, 9 ♀. *Epacanthion oliffi* sp. nov.

1 ♂. *Mesacanthion frica* sp. nov.

3 ♂, 1 ♀. *Metoncholaimus murphyi* sp. nov.

12 ♂, 16 ♀, 4 larvae. *Pheronous ogdeni* sp. et gen. nov.

2 ♂. *Platycoma sudafricana* sp. nov.

1 ♂. *Plectolaimus juliani* sp. et gen. nov.

3 ♂, 1 ♀, 12 larvae. *Trileptium longisetosum* sp. nov.

Sediments in the mouth of Durban Harbour (polluted) on 20.vi.1964. (M23n4.)

11 ♂, 6 ♀, 1 larva. *Rhabdodemania dura* sp. nov.

6 ♂, 12 ♀. *Wiesoncholaimus mawsonae* sp. et gen. nov.

From the same locality as M23n4 on same date (M23n11).

2 ♂, 11 ♀, 8 larvae. *Wiesoncholaimus mawsonae* sp. et gen. nov.

SYSTEMATIC CONSIDERATIONS

De Coninck (1965) has made a heroic attempt to provide a more reasonable classification of the free-living nematodes in which he divides the Superfamily Enoploidea into six families and fifteen subfamilies. Although some of these divisions appear to be reasonable others are certainly not at present acceptable. For example he still recognizes Thoracostomopsidae as a distinct family with only one genus *Thoracostomopsis*. But this genus is only a somewhat modified Enoplidae which is well within the ranges of variation shown by the genera currently referred to that family. Further, De Coninck refers *Hyalacanthion* Wieser, 1959 to one subfamily of the Enoplidae (Enoploidinae) and refers *Epacanthion* Wieser, 1953 to another (Enoplolaiminae). But I show below that the genera cannot be separated.

I argued recently (Inglis, 1964*) that *Enoplus* is a highly evolved form, while De Coninck treats it as a form ancestral to all the genera he refers to the family Enoplidae, but gives no indication of the origins of *Enoplus* itself. I have further argued, and still do, that the Enoplidae can be considered as having arisen from the genera commonly referred to the Family Phanodermatidae. In the latter family buccal rods appear to be commonly present and it is easy to imagine how, by a process of increased sclerotization, the region of the inner surface of the lip between these rods could become thickened to produce the mandibles so characteristic of the Enoplidae. Within the Enoplidae several lines can be crudely recognized along each of which the mandibular : onchial complex has been modified in a different way. The problem is not that of interpreting the components of each line but simply that we do not have enough information to make such an attempt worth while. We can only await the collection of more data and until then I still propose to recognize no groups other than Families and Genera.

* In this paper read cephalic ventricle for cephalic vesicle throughout.

DESCRIPTIVE SECTION

Family **LEPTOSOMATIDAE**

Platycoma sudafricana sp. nov.

(Text-figs. 1–6)

MATERIAL STUDIED. 2 ♂. Beach sand in the surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.), Reg. Nos. 1965.961–962.

A	B	C	Body length (mm.)
146·38	8·21	56·10	10·1
144·74	8·53	68·75	11·1

MEASUREMENTS (in mm., in order of body lengths)

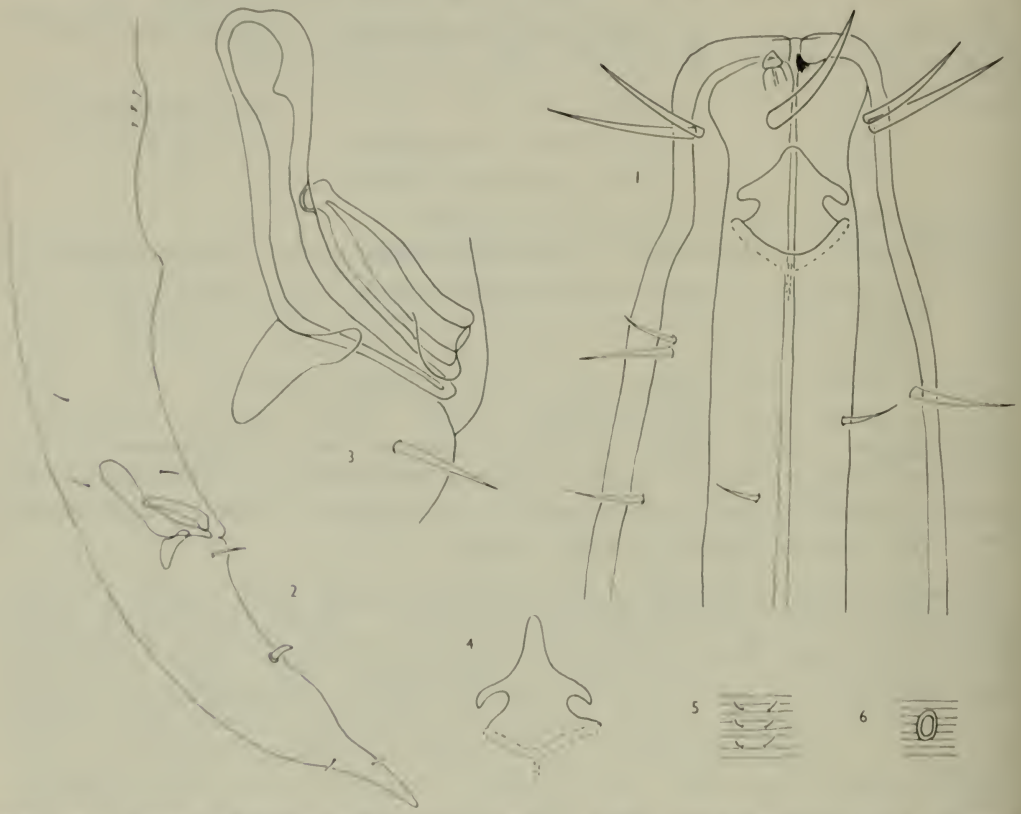
Body breadth : 0·069 ; 0·076. Oesophagus length : 1·23 ; 1·29. Diameter of head : 0·031 ; 0·029. Length of cephalic setae (long/short) : 0·023/0·018 ; 0·023/0·018. Distance from anterior end of body to posterior edge of amphid : 0·026 ; 0·027. Length of cervical setae : 0·014–0·018 ; 0·014–0·017. Distance of nerve ring from anterior end of body : 0·30 ; 0·29. Length of spicules : 0·163 ; 0·165. Length of lateral piece of gubernaculum : 0·033 ; 0·035. Length of apophosis of gubernaculum : 0·015 ; 0·014. Distance of first pre-cloacal supplement anterior to cloacal opening : 0·087 ; 0·122. Distance of second pre-cloacal supplement anterior to cloacal opening : not measured, tail too curved ; 0·198. Length of tail : 0·18 ; 0·16. Cloacal diameter : 0·066 ; 0·060.

The anterior end of the body is set off as a constricted region starting about the level of the posterior edge of the amphids (Text-fig. 1). The mouth opening is simple, tri-radiate and leads almost immediately into the oesophagus which carries three small wholly cuticular onchia on each sector (Text-fig. 1). The cephalic sense organs lie in two circles of which the inner consists of six prominent papillae while the outer consists of ten setae of which six are long and four are shorter (Text-fig. 1). There are many long cervical setae. The amphids are prominent with a large arrow-head-like flap of cuticle developed from their anterior edge (Text-figs. 1 and 4). The oesophagus is long and simple in outline.

The tail bears a pair of prominent spike-like setae about half-way along its length and a long but slim seta just posterior to the cloacal opening (Text-fig. 2). There is no spinerette and there are no caudal glands. On the mid-ventral surface of the body anterior to the cloacal opening there are two pre-cloacal supplements (Text-fig. 2) of which the more posterior (Text-fig. 6) is a rounded cap-like structure resembling a Type-1 campaniform organ (Inglis, 1963) while the more anterior (Text-fig. 5) is a raised area on which are located three pairs of short, stoutish setae.

The spicular : gubernacular complex is double. That is, all the structures shown in the figure (Text-fig. 3) are represented by exactly equivalent structures on the other side of the body and they are in no way connected across the mid-line of the body. Further, the entire complex appears to form one functional unit. Here I interpret the structures as Gerlach (1955) does and not as he re-interprets them later

(1959). That is I consider the largest L-shaped structure to be the spicule which is enfolded posteriorly by a slightly triangular-shaped gubernacular apophosis. The most interesting feature is the relationship between the spicule and the rod-like structure bordering it anteriorly (considered a spicule by Gerlach (1959)). This rod swells towards its distal end where it bears a lateral flange which enfolds the distal



FIGS. 1–6. *Platycoma sudafricana* sp. nov. Fig. 1. Lateral view of head. Fig. 2. General lateral view of male tail. Fig. 3. Detail of spicular : gubernacular complex from right side. Note the articulation between the spicule and the anterior part of the gubernaculum. Fig. 4. Variant form of amphid. Fig. 5. Ventral detail of more anterior pre-cloacal supplement. Fig. 6. Ventral detail of more posterior pre-cloacal supplement.

end of the spicule while the same rod swells to form a slight knob proximally which fits into a socket in the spicule.

Discussion

This genus appears to be characterized by the peculiar modification of the spicular apparatus, the presence of pre-cloacal supplements, the presence of the pair of stout, spine-like setae on the tail and in lacking caudal glands. In addition the head is highly characteristic with three small onchia and the marked sexual dimorphism of the amphids. In this respect the present species resembles *P. africanus* (Gerlach,

1959) but differs from it in the arrow-head-like form of the amphidial flap. *P. sudafricana* is also, possibly, characterized by the number and form of the pre-cloacal supplements and the form of the spicular : gubernacular complex.

Platycoma is very similar to *Platycomopsis* Ditlevsen, 1926 but this latter genus does not show any sexual dimorphism of the male amphids, and the male apparatus is more typical with long spicules and a short anterior part to the gubernaculum. This does, however, appear to represent a simpler version of the apparatus found in *Platycoma* and is one of the reasons for the interpretation I advance above. In addition *Platycomopsis* does not have the pair of spine-like setae on the male tail which is such a characteristic feature of the species referred to *Platycoma*.

Trileptium longisetosum sp. nov.

(Text-figs. 7–9)

Material studied. 3 ♂, 1 ♀, 12 larvae. Beach sand in the surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.) Reg. Nos. 1965.963–972.

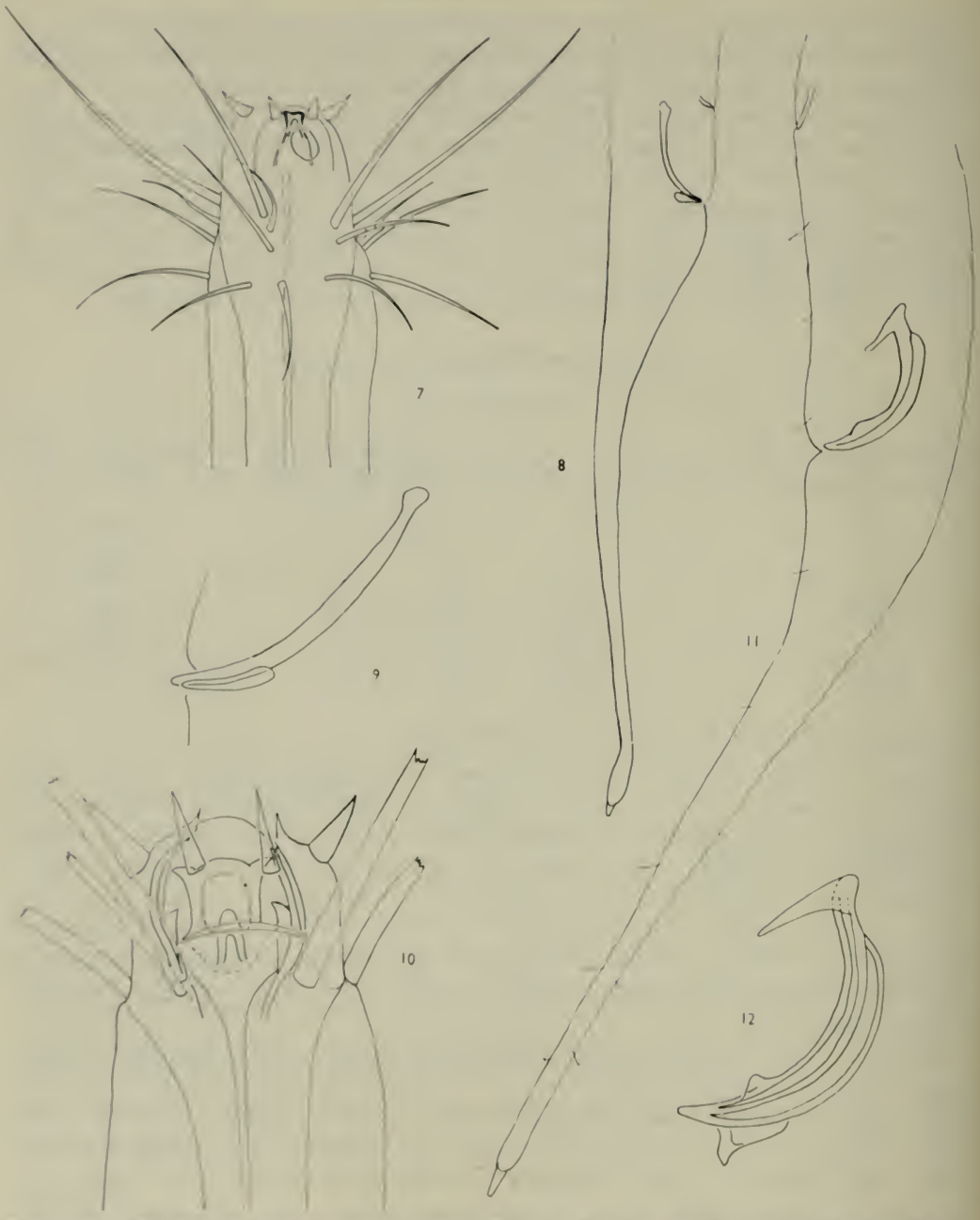
	A	B	C	V	Body length (mm.)
Males	10·64	5·63	22·69	—	4·68
	10·65	5·10	24·50	—	4·90
Female . . .	8·10	6·51	22·05	52·90	3·97
Larva	8·54	5·69	24·12	—	4·10

Measurements (in mm. in order of body lengths)

Males : Body breadth : 0·044 ; 0·046. Oesophagus length : 0·83 ; 0·96. Diameter of head : 0·017 ; 0·018. Length of cephalic capsule : 0·036 ; 0·034. Diameter of cephalic capsule at posterior end : 0·019 ; 0·022. Length of longest cephalic setae : 0·040 ; 0·039. Length of cervical setae : 0·018–0·020 ; broken. Distance of nerve ring from anterior end of body : 0·19 ; 0·21. Length of spicules : 0·047 ; 0·052. Length of gubernaculum : 0·018 ; 0·016. Length of pre-cloacal supplement : 0·0065 ; 0·0065. Distance of pre-cloacal supplement anterior to cloacal opening : 0·038 ; 0·040. Length of tail : 0·21 ; 0·20. Cloacal diameter : 0·036 ; 0·040.

Female : Body breadth : 0·049. Oesophagus length : 0·61. Diameter of head : 0·020. Length of cephalic capsule : 0·022. Diameter of cephalic capsule at posterior end : 0·025. Length of longest cephalic setae : 0·066. Length of cervical setae : 0·008. Distance of nerve ring from anterior end of body : 0·16. Length of tail : 0·18. Anal diameter : 0·036. Distance of vulva from anterior end of body : 2·1.

Larva : Body breadth : 0·048. Oesophagus length : 0·72. Diameter of head : 0·020. Length of cephalic capsule : 0·023. Diameter of cephalic capsule at posterior end : 0·021. Length of longest cephalic setae : 0·042. No cervical setae. Distance of nerve ring from anterior end of body : 0·19. Length of tail : 0·17. Anal diameter : 0·043.



FIGS. 7–9. *Trileptium longisetosum* sp. nov. Fig. 7. Ventro-lateral view of head. Fig. 8. Lateral view of male tail. Fig. 9. Spicule and gubernaculum from the left. Figs. 10–12. *Mesacanthion frica* sp. nov. Fig. 10. Dorsal view of head. The cephalic setae are not drawn in full because of their great length. Fig. 11. Lateral view of male tail. Fig. 12. Detail of spicule and gubernaculum (?) from the left.

The structure of the head is the same as that in *Trileptium ayum* Inglis, 1964 with three small onchia enclosed by three small mandibles. The setae of the inner circle of cephalic sense organs are very stout and prominent and the pouch of the cephalic slit is rounded and very prominent (Text-fig. 7). The "cephalic setae" are numerous and consist of six very long setae followed by two shorter setae on the dorso- and ventro-lateral positions and by one on the lateral positions. In the males there is one circle of ten cervical setae (Text-fig. 7) while there are four, much shorter setae in the equivalent position in the females. In addition there are a number of long, thin setae on the anterior end of the body which become sparser posterior to the nerve ring. Such setae measure 0·009–0·013 mm. in length.

The tail is long and narrow in both sexes and a very small rod-like pre-cloacal supplement is present on the ventral surface of the male anterior to the cloacal opening (Text-fig. 8).

The spicules are equal and identical with slightly cephalate proximal ends and bluntly rounded distal tips. The gubernaculum is simple and lies very close to the spicules (Text-fig. 9).

Discussion

This species is most similar to *T. ayum* Inglis, 1964 but differs from it in the number and distribution of the cervical setae and the short spicules. It appears to differ most markedly from all the other known species in having three onchia and a pre-cloacal supplement in the male.

Mesacanthion frica sp. nov.

(Text-figs. 10–12)

Material studied. 1 ♂. Sand in surf zone. Near Durban. Republic of South Africa (B8n8). B.M. (N.H.) Reg. No. 1965.1011.

A	B	C	Body length (mm.)
42·31	3·75	0·07	1·65

Measurements (in mm.)

Body breadth: 0·039. Oesophagus length: 0·44. Length of cephalic setae (anterior/longer posterior/shorter posterior): 0·013/0·096/0·051. Depth of cephalic capsule (?): 0·026. Diameter of cephalic capsule at posterior edge: 0·026. Distance of nerve ring from anterior end of body: 0·139. Length of body setae about level of nerve ring: 0·016. Length of spicules: 0·040. Length of pre-cloacal supplement: 0·012. Distance of pre-cloacal supplement anterior to cloacal opening: 0·078. Length of tail: 0·182. Cloacal diameter: 0·036.

The single specimen is in a rather poor condition so that some details cannot be reliably assessed. Nevertheless sufficient detail can be made out to warrant its description in view of the peculiar features it shows. The cephalic sense organs are

very long and those of the posterior circle appear to lie about the posterior edge of the cephalic capsule. This is, however, uncertain and is suggested largely on the basis of the shape of the anterior end of the body (see Text-fig. 10). The mandibles are prominent but fairly lightly developed and show no indication of any mandibular rods as in the species I refer elsewhere to *Mesacanthion* (Inglis, 1964). In addition, the shape of the anterior edge of the mandibles is different resembling the conditions in *Africanthion* in that their ends are directed towards the inter-labial spaces rather than inwards towards the mandibular cavity. The onchial plate is very poorly developed with the onchia projecting just anterior to the mandibular ring.

The tail is long and slim and a small, rod-like, pre-cloacal supplement is present (Text-fig. 11). The most remarkable feature of the specimen is the form of the spicules (Text-fig. 12), which possess a long narrow ventrally-posteriorly directed process on their anterior ends; are in addition stout with a lateral bump near their posterior ends and appear to have a median central ridge running their full length. There is (?) a small gubernaculum, although its presence is uncertain.

Discussion

This species is characterized by the form of the spicules with the massive process on their anterior ends. Otherwise the spicules resemble those in *Enoplolaimus crassidens* Ditlevsen, 1930.

Epacanthion oliffi sp. nov.

(Text-figs. 13–16)

Material studied. 2 ♂, 9 ♀. Beach sand in surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.) Reg. Nos. 1965.1004–1010.

	A	B	C	V	Body length (mm.)
Males	34·81	3·19	10·33	—	1·88
	38·36	3·10	10·14	—	2·11
Females . . .	25·34	3·49	11·64	58·92	1·85
	32·07	2·88	12·10	61·73	1·96
	32·58	3·16	8·98	58·42	2·02

Measurements (in mm., in order of body lengths).

Males: Body breadth: 0·054; 0·055. Oesophagus length: 0·59; 0·64. Diameter of cephalic capsule at posterior end: 0·034; 0·041. Depth of cephalic capsule: 0·033; 0·039. Length of cephalic setae (anterior/long posterior): 0·015/0·036; 0·016/0·039. Length of cervical setae: in range 0·035–0·039 on both specimens. Distance of nerve ring from anterior end of body: 0·131; 0·140. Length of spicules: 0·028; 0·029. Length of tail: 0·182; 0·208. Cloacal diameter: 0·044; 0·046. Length of setae on tail and on general body surface: up to 0·039 mm.

Females: Body breadth: 0·073; 0·058; 0·062. Oesophagus length: 0·53;

0·68 ; 0·64. Diameter of cephalic capsule at posterior end : 0·038 ; 0·039 ; 0·038. Depth of cephalic capsule : 0·039 ; 0·041 ; 0·042. Length of cephalic setae (anterior/long posterior/short posterior) : 0·017/0·034/0·015 ; 0·016/0·036/0·016 ; 0·017/0·033/0·015. Length of cervical setae : 0·032 ; 0·028 ; 0·035. Distance of nerve ring from anterior end of body : 0·162 ; 0·138 ; 0·165. Length of tail : 0·159 ; 0·162 ; 0·225. Anal diameter : 0·048 ; 0·044 ; 0·052. Distance of vulva from anterior end of body : 1·09 ; 1·21 ; 1·18.

The head is typically enoplid with three high, slim lips bearing distinct semi-lunar striations lying on an area bounded anteriorly by a curved line running posteriorly from the tips of the mandibles (Text-fig. 13). The major part of the remainder of the lips is also marked by striations which are much further apart. These conditions are exactly as described for *Enoploides* species (see Inglis, 1964, fig. 30). The mandibles are typical of the genus with what appear to be two parallel rods joined by a thin sheet of cuticle. As usual this is due to studying a curved solid structure in optical section. The anterior ends of the mandibles form well developed projecting hooks. The three equal onchia are rather small and lie posterior to the posterior edge of the mandibles and do not lie close within them as in *Hyalacanthion multipapillatum* Wieser, 1959.

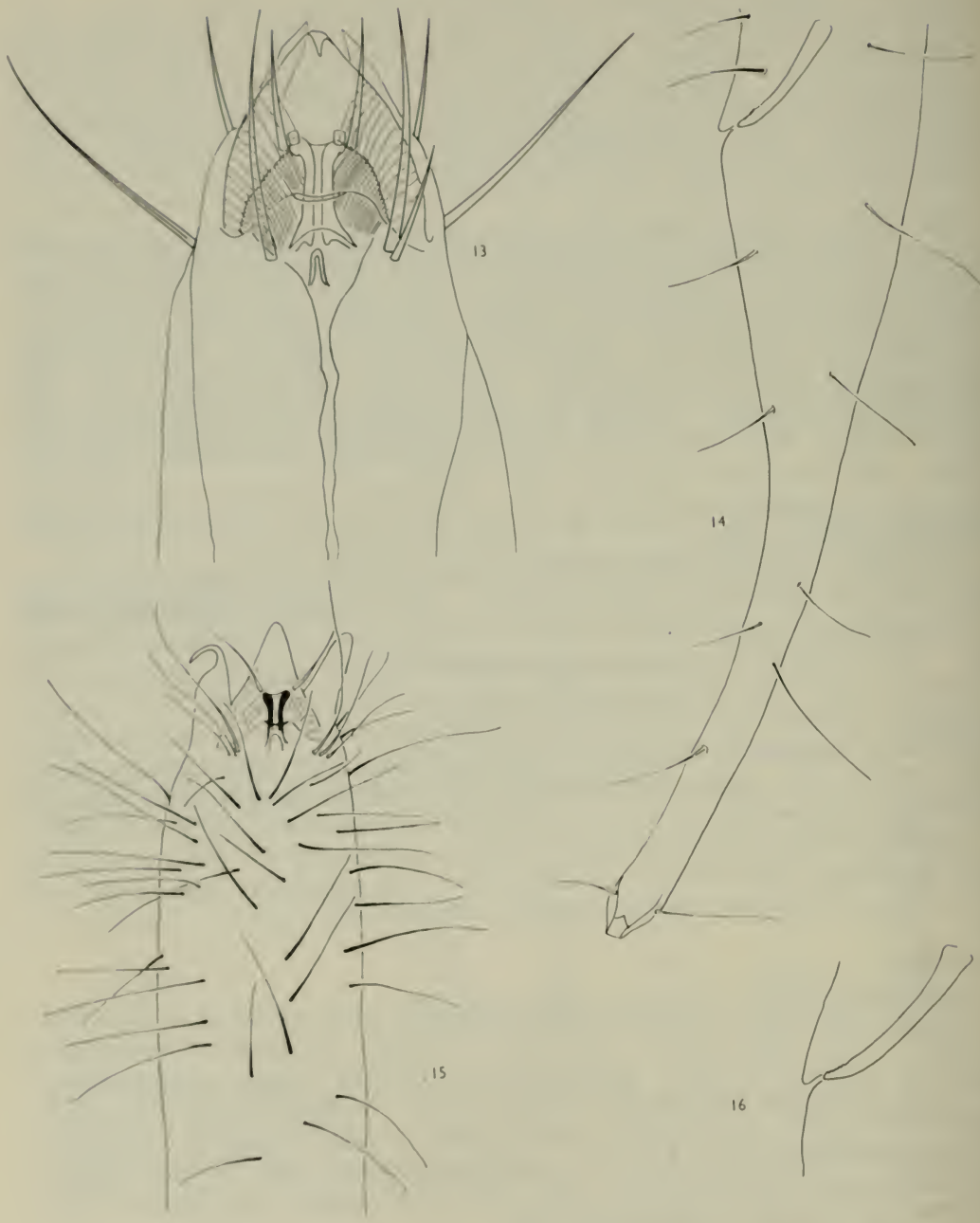
The cephalic setae are long and slim in both sexes with the more anterior pairs lying about the anterior end of the mandibles. Squarish blocks of specialized cuticle developed from the outer cuticle of head are closely associated with them (Text-fig. 13). In the females the outer setae are represented by six long setae and four short but in the males there are groups of three dorso- and ventro-laterally and two pairs laterally. In the females there are four long cervical setae but in the male the region of the body posterior to the cephalic capsule carries a very large number of long setae (Text-fig. 15). Setae become scarcer on the body posterior to about the level of the nerve ring but long setae occur sporadically over the entire length of the body.

The tail is somewhat blunt and stout in both sexes (Text-fig. 14). In the male there is no pre-cloacal supplement or gubernaculum. The spicules are short and stout with a series of serrations on their posterior ends (Text-fig. 16).

Discussion

Wieser (1959) erects a new genus *Hyalacanthion* for three species, *H. multipapillatum* Wieser, 1959 (type species) ; *H. pellucidus* (Savaljev, 1912) and *H. murmanicus* (Savaljev, 1912). This genus, as he points out, is very similar to *Epacanthion* ; the major differences between the two being that the mandibles in *Epacanthion* consist of two plates, separated by a lacuna, which are joined anteriorly by a narrow rod and the spicules are at least 2·5 anal diameters long while the mandibles in *Hyalacanthion* are plates joined by a thin transparent lamella and the long spicules are never less than 2·5 anal diameters long.

However Mawson (1958*a*) describes a new species, *Epacanthion brevispiculosum*, in which the spicules are considerably less than 2·5 anal diameters in length, and the species described above also has very short spicules. I do not think that *Epacanthion*



FIGS. 13–16. *Epacanthion oliffi* sp. nov. Fig. 13. Dorsal view of female head. Fig. 14. Lateral view of male tail. Fig. 15. Dorsal view of anterior end of male body. Fig. 16. Detail of spicule from the left.

can be separated from *Hyalacanthion* but the question is simplified by a study of the type male of *Enoplus butschlii* Southern, 1914 which Wieser (1953) selects as type species of *Epacanthion*. The structure of the lips and mandibles of this species is exactly the same as that described above for *E. oliffi*. The same semi-lunar striations are present on the lips, the same masses of dense cuticle on the outer surface of the lips, the onchia are in the same positions relative to the mandibles (that is, posterior to them) and the mandibles have exactly the same appearance. There is no indication of a distinct bar joining the so-called lateral bars of the mandibles as is illustrated by Wieser (1953) and by Southern (1914).

As a result *Hyalacanthion* must fall as a synonym of *Epacanthion* and I can see no reason to recognize two genera for the species previously grouped in the two genera. I am quite sure that the differences reported in the structure of the mandibles simply reflect the condition of the specimens when they were studied. But if later careful study shows a need for two genera a new name will be required. *Hyalacanthion multipapillatum* Wieser, 1959 is, therefore referred to the genus *Epacanthion* as a new combination.

E. oliffi is distinct from all the species with short spicules in lacking a gubernaculum and a pre-cloacal supplement and in the presence of such a large number of cervical setae. The species most similar to it appears to be *E. multipapillatum* (Wieser, 1959) in which the spicules are short and serrated but this species possesses a gubernaculum and a series of pre-cloacal supplements.

Rhandodemania dura sp. nov.

(Text-figs. 23–25)

Material studied. 11 ♂, 6 ♀, 1 larva. Polluted sediments in the mouth of Durban Harbour, Republic of South Africa (M23n4, collected 20.vi.1964). B.M. (N.H.) Reg. Nos. 1965.994–1003.

	A	B	C	V	Body length (mm.)
Males	32·02	7·01	24·38	—	3·17
	30·38	6·92	20·77	—	3·22
	33·57	6·97	24·19	—	3·29
	36·22	6·93	22·90	—	3·55
Females	34·32	6·37	22·71	54·30	3·02
	34·40	7·51	26·26	57·56	3·44
	32·84	7·09	23·87	53·63	3·58
	40·32	7·01	23·01	54·67	3·75
Larva	35·00	4·93	15·98	—	1·47

Measurements (in mm., in order of body lengths)

Males: Body breadth: 0·099; 0·106; 0·098; 0·098. Oesophagus length: 0·452; 0·465; 0·472; 0·512. Diameter of head: 0·016; 0·018; 0·017; 0·018. Length of cephalic setae (long/short): 0·0084/0·0063; 0·0083/0·0069; 0·0085/

0·0064 ; 0·0087/0·0065. Depth of buccal cavity : 0·020 ; 0·017 ; 0·019 ; 0·018. Length of spicules : 0·055 ; 0·045 ; 0·052 ; 0·048. Length of gubernaculum : 0·029 ; 0·026 ; 0·028 ; 0·031. Length of tail : 0·130 ; 0·155 ; 0·136 ; 0·155. Cloacal diameter : 0·058 ; 0·058 ; 0·057 ; 0·056.

Females : Body breadth : 0·088 ; 0·100 ; 0·109 ; 0·093. Oesophagus length : 0·474 ; 0·458 ; 0·505 ; 0·535. Diameter of head : 0·018 ; 0·016 ; 0·017 ; 0·019. Length of cephalic setae (long/short) : 0·0082/0·0063 ; 0·0085/0·0062 ; 0·0086/0·0061 ; 0·0084/0·0065. Depth of buccal cavity : 0·021 ; 0·022 ; 0·022 ; 0·020. Length of tail : 0·133 ; 0·131 ; 0·150 ; 0·163. Anal diameter : 0·057 ; 0·066 ; 0·065 ; 0·054. Distance of vulva from anterior end of body : 1·64 ; 1·98 ; 1·92 ; 2·05. Size of eggs : 0·045 × 0·165 ; 0·041 × 0·142 ; 0·054 × 0·123 (as examples).

Larva : Body breadth : 0·042. Oesophagus length : 0·298. Diameter of head : 0·012. Length of cephalic setae (long/short) : 0·0064/0·0037. Depth of buccal cavity : 0·016. Length of tail : 0·092. Anal diameter : 0·028.

The species is typical of the genus with the usual three pairs of long tooth-like structures which represent modified mandibles (see Inglis, 1964) and with the lip region of the head marked by striations (Text-fig. 23). There is a fairly prominent dorsal onchium and no ventro-lateral onchia.

The tail is bluntly rounded with a series of long stout setae, in the male (Text-fig. 25).

The spicules are slim with prominent caps on their proximal ends and are doubled at their distal ends (Text-fig. 24). They are roughly the same width along the whole of their lengths when viewed from the lateral aspect but have a ridge developed on their inner surfaces which can only be easily seen when the specimen being studied is viewed from a slightly ventral aspect. The gubernaculum is relatively long and slim with a very slight expansion towards the proximal end (Text-fig. 24).

Discussion

This species is characterized by the presence of only a dorsal onchium, by the slim shape of the spicules and gubernaculum, and by the cephalic setae being arranged in one circle only. In many ways it is similar to *R. nancyae* Inglis, 1964 which is also from South African waters but the shape of the spicules and gubernaculum is totally different while ventro-lateral onchia are totally lacking, although very reduced in *R. nancyae*.

Family **IRONIDAE**

The next species to be described differs from all others referred to the family in so many characters as to warrant reference to a new genus, thus :

PHERONOUS gen. nov.

Ironidae : cephalic sense organs all papillose ; two dorsal onchia and one on each ventro-lateral sector of the oesophagus ; no caudal glands.

Type species : *Pheronous ogdeni* sp. nov.

PHERONOUS OGDENI gen. et. sp. nov.

(Text-figs. 17–22)

Material studied. 12 ♂, 16 ♀, 4 larvae. Beach sand in the surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.) Reg. Nos. 1965.974–993.

	A	B	C	V	Body length (mm.)
Males	24·03	5·30	22·24	—	1·49
	34·71	5·73	26·03	—	1·77
	33·58	5·39	22·82	—	1·78
	38·83	5·52	25·38	—	1·98
Females . . .	27·50	5·34	14·59	52·45	1·43
	30·85	4·98	14·36	57·93	1·45
	28·81	6·06	13·94	56·58	1·52
	31·45	6·43	16·02	54·76	1·73
	34·04	6·48	15·13	53·67	1·77

Measurements (in mm., in order of body lengths)

Males: Body breadth: 0·062; 0·051; 0·053; 0·051. Oesophagus length: 0·281; 0·309; 0·330; 0·317. Diameter of head: 0·031; 0·023; 0·026; 0·023. Length of pharyngeal rods: 0·056; 0·062; 0·058; 0·057. Distance of nerve ring from anterior end of body: 0·128; 0·147; 0·140; 0·168. Length of spicules: 0·047; 0·041; 0·039; 0·035. Length of gubernaculum: 0·016; 0·019; 0·018; 0·020. Length of tail: 0·033; 0·032; 0·033; 0·033. Cloacal diameter: 0·067; 0·068; 0·076; 0·078.

Females: Body breadth: 0·052; 0·047; 0·054; 0·055; 0·052. Oesophagus length: 0·268; 0·291; 0·251; 0·269; 0·273. Diameter of head: 0·023; 0·019; 0·027; 0·025; 0·024. Length of pharyngeal rods: 0·055; 0·059; 0·057; 0·054; 0·056. Distance of nerve ring from anterior end of body: 0·121; 0·140; 0·123; 0·127; 0·124. Length of tail: 0·098; 0·101; 0·109; 0·093; 0·123. Anal diameter: 0·026; 0·029; 0·032; 0·033; 0·028. Distance of vulva from anterior end of body: 0·75; 0·84; 0·86; 0·93; 0·95.

The head is distinctly set-off from the remainder of the body by a constriction about the level at which the prominent oval shaped amphids open by narrow slits (Text-figs. 17 and 18). The mouth opening is bounded by three lip-lobes and is surrounded by six small papillae. The outer cephalic sense organs form one circle of stout papillae of which six are more prominent than the remaining four (Text-figs. 17, 18 and 19). The buccal cavity is lined by a large number of small wholly cuticular denticles and the anterior end of the oesophagus bears a series of wholly cuticular onchia. There is a pair of small onchia on the dorsal sector of the oesophagus and a single larger onchium on each ventro-lateral sector (Text-fig. 20). The anterior end of the oesophagus is modified as a distinct oesophastomal region in which the

FIGS. 17–22. *PHERONOUS ogdeni* gen. et sp. nov. Fig. 17. Lateral view of head and oesophastomal region of body. Fig. 18. Dorsal view of head. Note double onchia. Fig. 19. *En face* view of head. Fig. 20. Sketch of onchia *en face*. Fig. 21. Detail of spicule and gubernaculum from the right. Fig. 22. Lateral view of male tail.

FIGS. 23–25. *Rhabdodemania dura* sp. nov. Fig. 23. Lateral view of head with the dorsal surface to the right. Fig. 24. Detail of spicule and gubernaculum from the right. Fig. 25. Lateral view of male tail.

musculature runs slightly anteriorly (Text-fig. 17) and in which the cuticular lining is very prominent. The slim oesophagus expands evenly towards its posterior end.

The tail tapers to a sharp point and there are no caudal glands. In the male the tail bears a series of three pairs of small ventro-lateral papillae and a series of four pairs of similar papillae anterior to the cloacal opening (Text-fig. 22). The spicules are stout and clumsy in appearance without any particularly characteristic features although a dorsal strengthened rib sometimes appears to be present. The gubernaculum is small and enfolds the distal ends of the spicules (Text-fig. 21).

Discussion

This species is unusual in lacking caudal glands, otherwise it would be referable to the genus *Dolicholaimus*. It is possible that it also differs from the species generally referred to that genus in possessing a pair of small dorsal onchia but this is still uncertain (see Inglis, 1961).

Family **ONCHOLAIMIDAE**

Metoncholaimus murphyi sp. nov.

(Text-figs. 26–32)

Material studied. 3 ♂, 1♀. Beach sand in surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.), Reg. Nos. 1965.1012–1015.

	A	B	C	V	Body length (mm.)
Males	61·05	5·31	62·71	—	2·32
	64·36	5·86	66·05	—	2·51
	61·05	5·31	62·71	—	2·32
Female. . . .	52·31	5·55	59·13	70·22	2·72

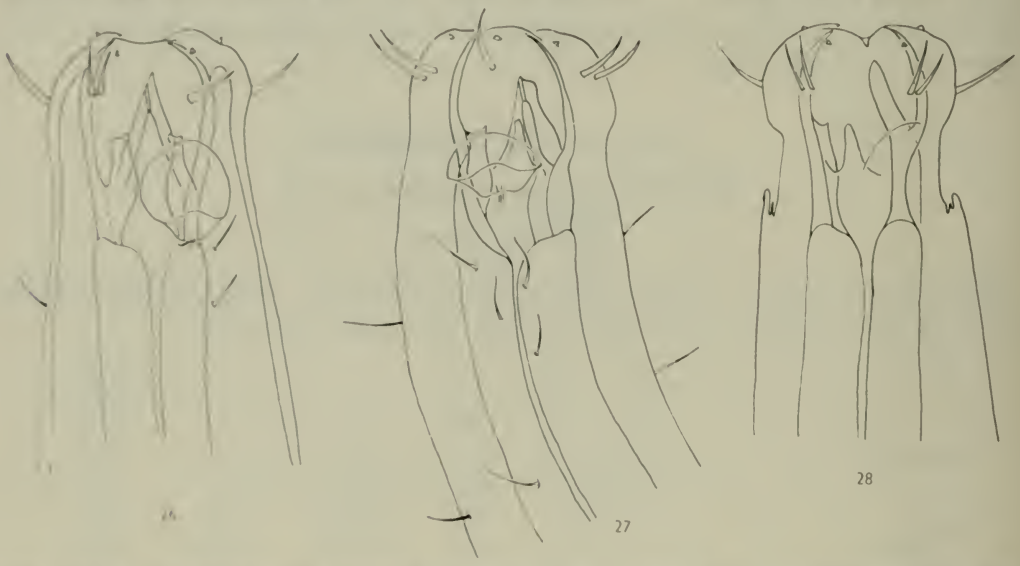
Measurements (in mm., in order of body lengths)

Males: Body breadth: 0·038; 0·039; 0·038. Oesophagus length: 0·437; 0·428; 0·419. Diameter of head: 0·027; 0·024; 0·026. Length of cephalic setae (long/short): 0·012/0·008; 0·011/0·009; 0·012/0·008. Buccal cavity (greatest length/greatest width): 0·035/0·017; 0·032/0·018; 0·035/0·019. Distance of nerve ring from anterior end of body: 0·181; 0·179; 0·198. Length of spicules: 0·082; 0·069; 0·077. Length of tail: 0·037; 0·038; 0·043. Cloacal diameter: 0·029; 0·022; 0·026. Lengths of circum-cloacal setae (p/a1/a2/a3): 0·012/0·017/0·013/0·007; 0·013/0·018/0·016/0·008; 0·016/0·021/0·017/0·009 (see Text-fig. 29 for details).

Female: Body breadth: 0·052. Oesophagus length: 0·490. Diameter of head: 0·036. Length of cephalic setae (long/short): 0·012/0·009. Buccal cavity (greatest length/greatest width): 0·044/0·023. Distance of nerve ring from anterior end of body: 0·22. Distance of excretory pore from anterior end of body: 0·026. Length

of tail: 0·046. Anal diameter: 0·036. Distance of vulva from anterior end of body: 1·91. Distance of demanian pore anterior to posterior end of body: 0·072. Distance of uvette anterior to posterior end of body: 0·26. Distance of osmosium anterior to uvette: 0·36. Length of uterine efferent: 0·66.

The head is typical with a fairly long buccal cavity with roughly parallel sides (Text-figs. 26, 27 and 28). There is an inner circle of six papillae and an outer circle of cephalic setae of which six are slightly longer than the remaining four. The left ventro-lateral onchium is considerably larger than the smaller and equal dorsal and right ventro-lateral onchia, both of which have somewhat blunt, slightly doubled anterior ends (Text-figs. 26 and 27). The amphids are prominent with slightly different degrees of development of the anterior concavity (Text-figs. 26, 27 and 31).



Figs. 26–28. *Metoncholaimus murphyi* sp. nov., head. Fig. 26. Left-ventro-lateral view. Fig. 27. Wholly lateral view. Fig. 28. Wholly dorsal view.

The male tail is short and sharply curved, almost hook-like, with a pair of long stout post-cloacal setae (p in Text-fig. 29), and two similar pairs flanking the cloacal opening, of which the more posterior is longer than the more anterior (a1, a2 in Text-fig. 29). In addition there is a further pair of shorter setae (a3 in Text-fig. 29) which appear to be slightly longer than the setae occurring on the general body surface except that, while these latter body setae vary somewhat in position from specimen to specimen, this pair (a3) is always found in the same position.

The equal and identical spicules are long and slim and a small gubernaculum may be present (Text-fig. 29) but this is uncertain. There is a marked thickening of the cuticle to form a bump on the body, just anterior to the cloacal opening, into which a duct appears to open. The structure is definitely present but its details could not be established with certainty (Text-figs. 29 and 32).

The female tail is short and stout (Text-fig. 30) and the demanian system empties through a single pore which opens slightly to the left of the mid-ventral line of the body. The details of the demanian system could not be wholly established but (using the terminology of Cobb, 1930) the *uvette* is surrounded by leaf-like elements, the *uterine efferent* is long, stout and easily seen and the *osmosium* could be identified 0·364 mm. anterior to the *uvette*. The relative measurements of the various parts that could be identified are given above.

Discussion

This is a typical member of the genus *Metoncholaimus* which can be easily distinguished by the presence of only one demanian pore in the female (otherwise known only from *M. haplotretos* Mawson, 1958*a*), by the extreme length of the spicules in association with the form of the male tail, by the small number of long circumcloacal setae, and by the length of the cephalic setae.

WIESONCHOLAIMUS Gen. Nov.

The specimens described below resemble most closely those referred to the genus *Metaparoncholaimus* De Coninck & Schuurmans Stekhoven, 1933 in the unpaired female reproductive system, the two long, equal ventro-lateral onchia and the presence of a demanian system. It differs markedly, however, in the presence of the large gubernaculum, the form of the tail and the long, slim spicules. It is, therefore, referred to a new genus, thus :

WIESONCHOLAIMUS gen. nov.

Oncholaimidae : ventro-lateral onchia equal and larger than dorsal ; tail long and stout. Male : spicules very long and slim ; large gubernaculum present. Female : Demanian system present.

Type species : *Wiesoncholaimus mawsonae* sp. nov.

WIESONCHOLAIMUS MAWSONAE gen. et sp. nov.

(Text-figs. 33–35)

Material studied. 6 ♂, 12 ♀. Polluted sediments in the mouth of Durban Harbour, Republic of South Africa (M23n11). B.M. (N.H.) Reg. Nos. 1965.1016–1030. (Holotype selected from this sample.)

2 ♂, 11 ♀, 8 larvae. From same locality on same date at a depth of 40 feet (M23n4). B.M. (N.H.) Reg. Nos. 1965.1031–1040.

	A	B	C	V	Body length (mm.)
Males	70·16	12·14	44·02	—	4·49
	64·03	11·29	41·22	—	4·74
	70·27	12·09	40·94	—	5·20
Females . . .	51·41	9·85	31·96	67·75	4·73
	54·95	10·87	33·84	64·38	5·11
	54·76	13·76	34·81	64·72	5·64

Measurements (in mm., in order of body lengths. All ex M23n11)

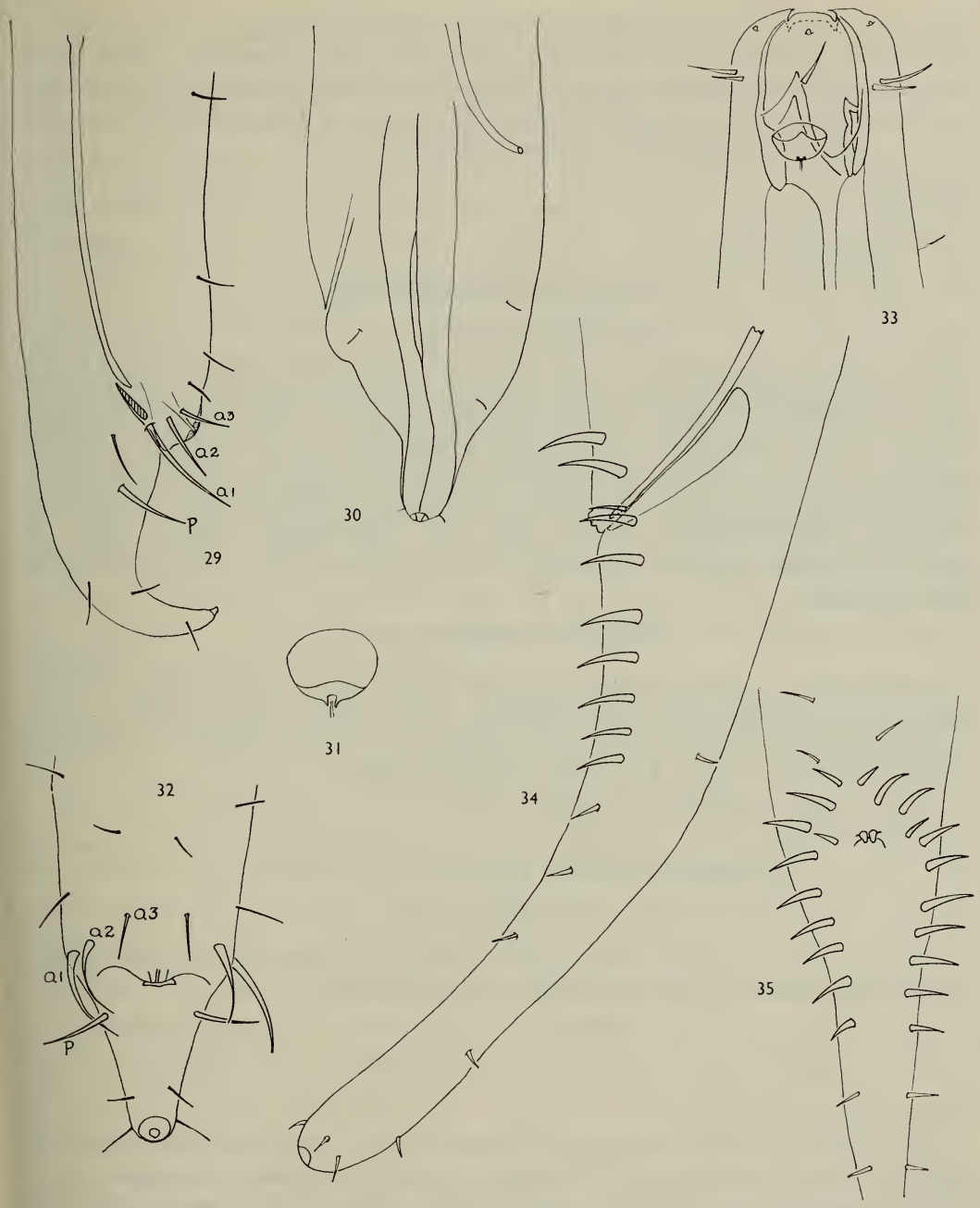
Males: Body breadth: 0·064; 0·073; 0·074. Oesophagus length: 0·37; 0·42; 0·43. Diameter of head: 0·033; 0·030; 0·030. Length of cephalic setae (long/short): 0·0090/0·0051; 0·0088/0·0053; 0·0091/0·0052. Dimensions of buccal cavity (length/breadth): 0·032/0·018; 0·038/0·016; 0·033/0·018. Distance of excretory pore from anterior end of body: 0·095; 0·103; 0·096. Length of spicules: 0·189; 0·211; 0·183. Length of tail: 0·102; 0·115; 0·127. Cloacal diameter: 0·032; 0·032; 0·035.

Females: Body breadth: 0·092; 0·093; 0·103. Oesophagus length: 0·48; 0·47; 0·41. Diameter of head: 0·032; 0·030; 0·030. Length of cephalic setae (long/short): 0·0086/0·0049; 0·0092/0·0051; 0·0087/0·0050. Dimensions of buccal cavity (length/breadth): 0·033/0·020; 0·038/0·020; 0·035/0·019. Distance of excretory pore from anterior end of body: 0·089; 0·121; 0·107. Length of tail: 0·148; 0·151; 0·162. Anal diameter: 0·038; 0·040; 0·036. Distance of vulva from anterior end of body: 3·11; 3·29; 3·65. Size of eggs: 0·083 × 0·0067; 0·097 × 0·078; 0·070 × 0·106 (as examples).

The head bears an inner circle of six papillae surrounding the six-lobed mouth opening and an outer circle of ten setae of which six are longer than the remaining four. The amphids are smallish and lie about the level of the posterior quarter of the buccal cavity. The buccal cavity contains two large, equal ventro-lateral onchia and a smaller dorsal onchium (Text-fig. 33).

The tail is long and stout in both sexes (Text-fig. 34) and in the male the spicules are long, slim and equal in length. The gubernaculum is relatively massive (Text-fig. 34). There is a doubled papilla-like structure on the anterior lip of the cloacal opening in the male (Text-figs. 34 and 35) but no details of any nerves or ducts could be seen. The male tail bears a series of long, stout setae which continue anteriorly to surround the cloacal opening (Text-fig. 34). The number of these setae varies slightly from eight to ten and they are not always wholly symmetrical. Nevertheless there is always a pair of smaller setae flanking the cloacal opening (Text-figs. 34 and 35). In addition there is a variable number of smaller, thorn-like setae on the surface of the tail.

The demanian system is well developed in the females and opens by two dorso-lateral pores which lie 0·23 mm. anterior to the anus in a specimen 4·9 mm. long (from sample M23n4). A most characteristic feature of the system is that the *uvette*,



FIGS. 29–32. *Metoncholaimus murphyi* sp. nov. Fig. 29. Lateral view of male tail. Fig. 30. Lateral view of female tail. Fig. 31. Variant form of amphid. Fig. 32. Ventral view of male tail. (Labelling on Figs. 29 and 32 is defined in the text.)

FIGS. 33–35. *WIESONCHOLAIMUS mawsonae* gen. et sp. nov. Fig. 33. Lateral view of head with dorsal surface to the right. Fig. 34. Lateral view of male tail. Note that for convenience the whole length of the spicule is not drawn. Fig. 35. Ventral view of male tail.

which lies 0·52 mm. anterior to the anus, is a simple spherical organ from which a stout *uterine efferent* runs anteriorly and a thin duct runs posteriorly. This single duct is very easily seen and is a distinct structure as I have established by dissection. It has not, however, been possible to establish any further details of the structure of the demanian system in spite of several attempts.

Discussion

See above, page 97.

Family **LEPTOLAIMIDAE**

PLECTOLAIMUS gen. nov.

This species described below is clearly related to those generally referred to the family Leptolaimidae (sensu de Coninck, 1965) and is most similar to the members of the genera *Chronogaster* Cobb, 1913 and *Halaphanolaimus* Southern, 1914. It differs from them both in the form of the posterior end of the oesophagus and the modification of the anterior end of the oesophagus (in which it is convergent with the Rhabditoid genera *Odontorhabditis* Timm, 1959 and *Cheilorhabditis* Timm, 1959). In addition it appears to differ in the presence of very distinct lips. The genus may be diagnosed thus :

PLECTOLAIMUS gen. nov.

Leptolaimidae : mouth bounded by six distinct lips ; onchia-like structures developed at anterior end of oesophagus from ventro-lateral sectors ; post-oesophageal bulb-like region present with small tri-valvulate structure ; pre-cloacal rod-like supplements present on ventral surface of male.

Type species : *Plectolaimus juliani* sp. nov.

PLECTOLAIMUS JULIANI gen. et sp. nov.

(Text-figs. 36–43)

Material studied. 1 ♂. Beach sand in surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.) Reg. No. 1965.973.

A	B	C	Body length (mm.)
55·58	20·21	31·76	2·89

Measurements (in mm.)

Body breadth : 0·052. Oesophagus length : 0·143. Body breadth at level of amphids : 0·017. Diameter of amphids : 0·0065. Length of cephalic setae : 0·013. Distance of excretory pore from anterior end of body : 0·058. Length of spicules : 0·062. Length of gubernaculum : 0·018. More posterior pre-cloacal supplement (distance anterior to cloacal opening/length) : 0·059/0·033. More anterior pre-cloacal supplement (distance anterior cloacal opening/length) : 0·124/0·044. Length of tail : 0·091. Cloacal diameter : 0·065.

The cuticle is marked by distinct annules separated from each other by narrow, shallow striations which start at the base of the lips. The annules are marked by distinct elongate punctations over the lateral region of the body from about the middle of the oesophagus to the tip of the tail (Text-fig. 38). There are two files of pores on each lateral surface of the body over its whole length.

The mouth opening is bounded by six very distinct lips each of which bears two papillae (Text-fig. 36). More posteriorly, about the level of the anterior end of the oesophagus, there are four prominent, stout setae. The amphids are circular pits into which the nerves enter on the dorsal side. There is a distinct cheilostome. The anterior end of the oesophagus is modified as an elongate region with thickened walls, at the anterior end of which are two flat onchial-like modifications. These structures are at different levels so that from the ventral view the structure on the left ventro-lateral sector of the oesophagus lies anterior to the corresponding structure on the right ventro-lateral sector. In addition both project dorsally to lie in a pocket formed in the dorsal sector of the oesophagus (Text-figs. 36 and 40).

Posterior to the strongly cuticularized oesophastomal region is a region in which the dorsal sector of the oesophagus develops a slightly rounded bulge which displaces the ventro-lateral sectors. This region does not bear any tooth like structures. Posterior to this region the lumen of the oesophagus develops radial tubes which continue posteriorly for about two-thirds of the length of the oesophagus when they disappear. It has not been possible to make this out in detail but there is definitely no indication of a median bulb.

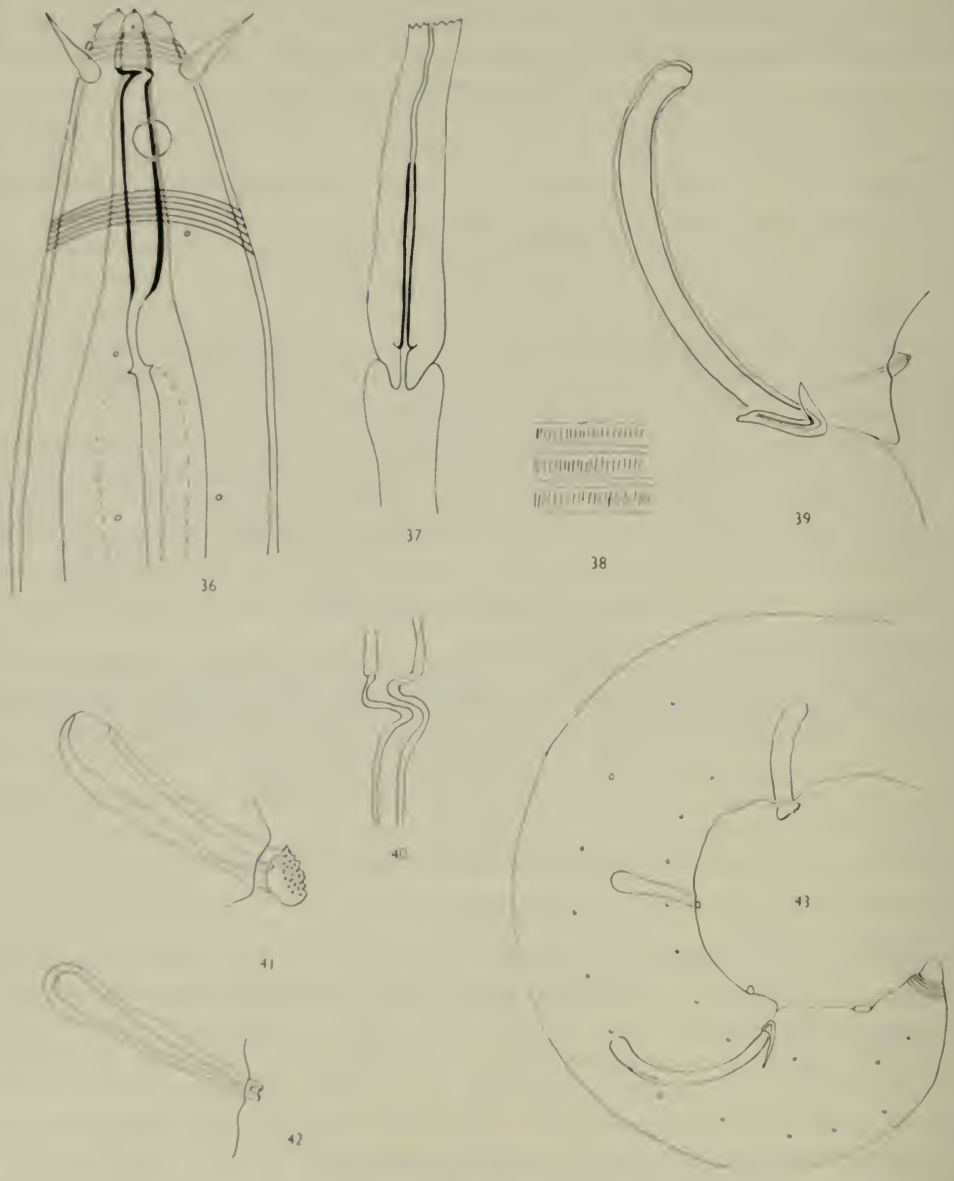
The posterior end of the oesophagus is slightly club shaped and no definite bulb is present. Nevertheless internally it is modified to form a distinct small tri-valvulate structure at the posterior end of a long region in which the cuticular lining of the lumen of the oesophagus is markedly thickened (Text-fig. 37).

The tail is short and stout and is curved strongly ventrally (Text fig. 43) so that the measurements of this region are probably rather low. On the tail roughly half way between the tip and the cloacal opening is a distinct papilla like structure while on the mid-ventral line of the body anterior to the cloacal opening there are three supplementary organs. Of these the most posterior lies just anterior to the cloacal opening and is a prominent papilla-like organ. The details of its structure are uncertain as the body is in a rather poor condition in this region but such a structure is definitely present and a nerve supplies it (Text figs. 39 and 43). The remaining pre-cloacal supplements are more typical. They are long massively cuticularized rods of which the more posterior (Text fig. 42) is rather simple in structure with a slight pit in its distal, protruding end. The more anterior is more massive and the distal end is expanded into a cap covered by many small denticles (Text fig. 41).

The equal and identical spicules are simple in structure being roughly the same width along their full lengths. They terminate distally in slightly rounded tips which are enclosed by a small arrow like gubernaculum (Text fig. 39).

Discussion.

See above, p. 100.



FIGS. 36–43. *PLECTOLAIMUS juliani* gen. et sp. nov. Fig. 36. Anterior end of body from lateral aspect with dorsal surface to the right. Fig. 37. Posterior end of oesophagus. Fig. 38. Sketch showing detail of punctation markings on lateral surface of body. Fig. 39. Lateral view of spicules and gubernaculum. Fig. 40. Sketch of modifications at anterior end of oesophagus from the ventral aspect. Fig. 41. Detail of anterior pre-cloacal supplement. Fig. 42. Detail of posterior pre-cloacal supplement. Fig. 43. Lateral view of male tail.

Family **TRIPYLOIDIDAE**

Bathylaimus deconincki sp. nov.

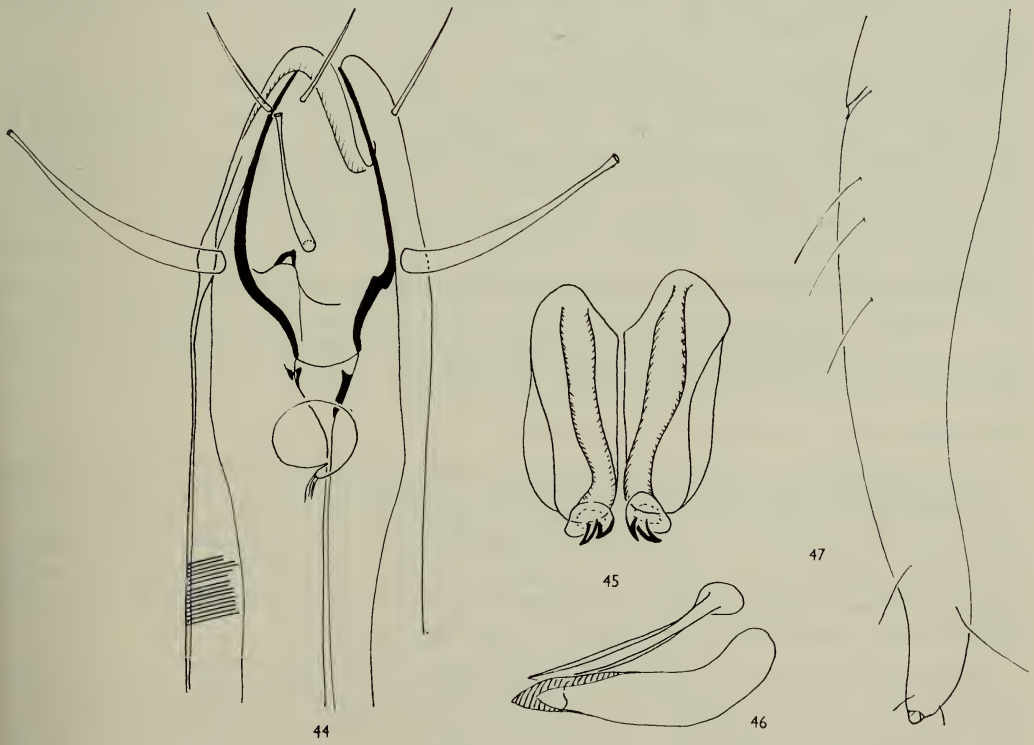
(Text-figs. 44–47)

MATERIAL STUDIED. 1 ♂. Beach sand in surf zone. Near Durban, Republic of South Africa (B8n8). B.M. (N.H.) Reg. No. 1965.994.

A	B	C	Body length (mm.)
57·95	3·48	16·26	2·26

MEASUREMENTS (in mm.)

Body breadth : 0·039. Oesophagus length : 0·65. Diameter of head at level of posterior cephalic setae : 0·030. Diameter of head at level of amphids : 0·034. Lateral diameter of amphid : 0·010. Antero-posterior diameter of amphid : 0·009. Length of more anterior cephalic setae : 0·014. Length of more posterior cephalic setae : 0·038. Depth of buccal cavity from anterior end to level of ventro-lateral onchia : 0·030. Depth of second part of buccal cavity : 0·029. Length of spicules :



FIGS. 44–47. *Bathylaimus deconincki* sp. nov. Fig. 44. Lateral view of head with dorsal surface to the right. Fig. 45. Ventral view of gubernaculum. Fig. 46. Lateral view of spicules and gubernaculum. Fig. 47. Lateral view of male tail.

0·030. Length of gubernaculum : 0·036. Length of tail : 0·139. Cloacal diameter : 0·051.

The cuticle is marked by very fine, close-set transverse striations. The head bears two circles of six setae of which the members of the more posterior circle are typically cup-shaped distally. The four short setae usually associated with this posterior circle were not found but they may have been overlooked. The amphid is a prominent cavity with thin walls into which the nerve enters from the posterior edge (Text fig. 44).

The mouth opening is bounded by three lips which meet at a level roughly half way between the two circles of cephalic setae. The buccal cavity is large and the thick cuticle lining it is continued as a lobe into each lip. In each lip, just anterior to the level at which each lobe of the buccal cavity lining stops, the cuticle is marked by a series of fine antero-posterior striations. The buccal cavity itself is tulip-shaped with two prominent ventro-lateral onchia at the level of its widest part and a slight bump in the corresponding dorsal position. In the region of the oesophagus immediately posterior to the buccal cavity the lumen of the oesophagus is slightly expanded to form a cavity which is not lined by thickened cuticle but which does bear three wholly cuticular onchia (Text-fig. 44). The oesophageal musculature is apparently attached to the cuticle of the body at the level of the more posterior circle of cephalic sense organs.

The tail is fairly stout and carries a series of long, very thin setae which are about 0·02 mm. in length (Text fig. 47). The spicules are short, equal and identical in structure with very distinctly capitate proximal ends and appear to bear very narrow alae. The gubernaculum is the usual massive structure from the lateral aspect with a well chitinized posterior tip and a somewhat slightly chitinized massive region more anteriorly (Text fig. 46). From the ventral aspect, however (Text fig. 45), the gubernaculum is seen to be in two bilaterally symmetrical pieces consisting of a well chitinized median ridge which projects ventrally from a more expanded dorsal plate. The median ridge terminates posteriorly in a swelling from which two tooth-like structures arise on the inner sides (Text-fig. 45).

Discussion

The identification of species referable to this genus is, as with so many others, very difficult in view of the superficiality of most of the available descriptions. It can, however, be said that the genus *Parabathylaimus* De Coninck & Schuurmans Stekhoven, 1933 can certainly be accepted, as Luc & De Coninck (1959) argue, in spite of Wieser's (1956) suggestion that the recognition of a divided or undivided buccal cavity is too difficult to make a useful character.

Delimination of species within this genus appears to be based largely on the use of measurements and the structure of the buccal cavity, in spite of Weiser's comments. Nevertheless the structure of the gubernaculum may be of value but there are very few useful descriptions available. The figures given by de Man (1922) and by De Coninck & Schuurmans Stekhoven (1933) for *B. assimilis* de Man, 1922 suggest that the form of the posterior end of the gubernaculum may be valuable since in that

species it is very different from the condition in *B. deconincki*, in that the tooth-like modifications are much longer and slimmer and arise from the outer surface and not the inner as in my species.

This species is otherwise characterized by the posterior position of the large amphid, the form of the tail and, apparently, by the shape and relative lengths of the guberanculum and spicules.

REFERENCES

Cobb, N. A. 1930. The demanian vessels in nemas of the genus *Oncholaimus* with notes on four new oncholaims. *J. Wash. Acad. Sci.* **20** (12) : 225–241.

De Coninck, Lucien. 1965. Systématique des nématodes, in *Traité de zoologie. Anatomie, systématique, biologique. Embranchement des Némathelminthes* (*Nematelmia Carl Vogt* 1851–*Nemathelminthia Gegenbaur* 1859) *ou Aschelminthes* (*Aschelmintha Grobben* 1910). **4** (2) : 586–681.

De Coninck, Lucien A. P. & Schuurmans Stekhoven, J. H. 1933. The free-living marine nemas of the Belgian coast. II. With general remarks on the structure and system of nemas. *Mém. Mus. Hist. nat. Belg.* **58** : 1–163.

Ditlevsen, Hjalmar. 1926. Freeliving nematodes. *Dan. Ingolf-Exped.* **4** (6) : 1–42.

—— 1930. Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. LII. Marine free-living nematodes from New Zealand. *Vidensk. Medd. Dansk. naturh. Foren.* **87** : 201–242.

Gerlach, Sebastian A. 1955. Zur Kenntnis der freilebenden marinen Nematoden von San Salvador. *Z. wiss. Zool.* **158** : 249–303.

—— 1959. Drei neue Nematoden aus dem Küstengrundwasser der Insel Abd al-Kuri (Golf von Aden). *Zool. Anz.* **163** : 360–364.

—— 1962. Freilebende Meeresnematoden von den Maldiven. *Sond. Keil. Meeresforsch.* **18** : 81–108.

Inglis, William G. 1961. Free-living marine nematodes from South Africa. *Bull. Brit. Mus. nat. Hist.* (*Zoology*) **7** (6) : 291–319.

—— 1963. " Campaniform-type " organs in nematodes. *Nature* **197** : 618.

—— 1964. The marine Enoplida (Nematoda) : a comparative study of the head. *Bull. Brit. Mus. nat. Hist.* (*Zoology*) **11** (4) : 263–376.

Luc, Michel & De Coninck, L. A. 1959. Nématodes libre marines de la région de Roscoff. *Arch. zool. exp. gén.* **98** : 103–165.

de Man, J. G. 1922. Uber einige Marine Nematoden von den Kuste von Walcheren, neu für die Wissenschaft und für unsere Fauna, unter welchen der sehr merkwürdige *Catalaimus Max Weberi* n. sp. *Bijdr. Dierk.* **22** : 117–124.

Mawson, Patricia M. 1958a. Free-living nematodes. Section 2. Additional Enoploidea from Antarctic stations. *Rep. B.A.N.Z. Antarct. Res. Exped. Ser. B.* **6** (13) : 293–305.

—— 1958b. Free-living nematodes. Section 3. Enoploidea from Subantarctic stations. *Rep. B.A.N.Z. Antarct. Res. Exped.* Ser. B, **6** (14) : 307–358.

Savaljev, S. 1912. Zur Kenntnis der freilebenden Nematoden des Kolafjords und des Relictensees Mogilnoje. *Trav. Soc. Nat. Leningr.* **43** : 108–126.

Southern, R. 1914. Clare Island Survey. Part 54. Nemathelmia, Kinorhyncha and Chaetognatha. *Proc. R. Irish Acad.* **31** : 1–80.

Timm, Richard W. 1959. *Cheilorhabditis* and *Odontorhabditis*, two new genera of soil nematodes allied to *Rhabditis*. *Nematologica* **4** : 198–204.

WIESER, WOLFGANG. 1953. Reports of the Lund University Chile Expedition 1948–1949. 10. Free-living nematodes. I. Enoploidea. *Acta Univ. lund.* N.S. **49** (6) : 1–155.

—— 1956. Reports of the Lund University Chile Expedition, 1948–49. 26. Free-living marine nematodes. III. Axonolaimoidea and Monhysteroidea. *Acta. Univ. lund.* N.S. **53** (13) : 1–115.

—— 1959. Free-living nematodes and other small invertebrates from Puget Sound beaches. *Univ. Wash. Publ. Biol.* **19** : 1–179.